

CLAIMS

1- Pulsed-plasma ion-nitriding process characterized by positioning the sample (1) that is the cathode itself, in the interior of a nitriding chamber (2),
5 whose internal wall is the anode (3), wherein vacuum is made by means of a vacuum pump (4) until the pressure gauge (5) reads a pressure of, for example, equal to 30 mTorr (3.99×10^{-6} MPa), in which chamber a gas inlet (6) is used to introduce a nitrogen rich gaseous mixture with composition
10 varying in the range $N_2 + 0\%-50\% H_2$, choosing a work pressure of, for example, about 4 Torr (5.33×10^{-4} MPa), and applying a difference of potential (7) that corresponds to a temperature of up to 400 °C measured by means of a thermocouple (8), such that the nitriding times are
15 calculated from the sum of the periods of time that the plasma was active, so as to keep this total time a fixed value, and after finishing the nitriding treatment the samples are cooled within the nitriding chamber under a nitrogen atmosphere.

20 2- "Pulsed-Plasma Ion-Nitriding Process" in accordance with reinvindication 1, characterized to be a method to obtain a diffusion barrier for hydrogen in steel.

3- "Pulsed-Plasma Ion-Nitriding Process" in accordance with reinvindication 1, characterized to be
25 performed in steel using an extended range of temperatures, from room temperature to 400 °C, preferentially in temperatures between 300 and 400 °C.

4- "Pulsed-Plasma Ion-Nitriding Process" in accordance with reinvindication 1, by making use of a gaseous
30 mixture preferentially for the example disclosed in the range

N₂ + 0% - 20% H₂.

5- "Pulsed-Plasma Ion-Nitriding Process" in accordance with reinvindication 1, characterized by calculating the nitriding times from the summation of the
5 times in which the plasma was active, in order to keep this total time at a fixed value.

6- "Pulsed-Plasma Ion-Nitriding Process" in accordance with reinvindication 1, characterized by measuring the hydrogen permeability in the pulsed-plasma ion-nitrided
10 steel hundreds of times smaller than the hydrogen permeability in the substrate steel.